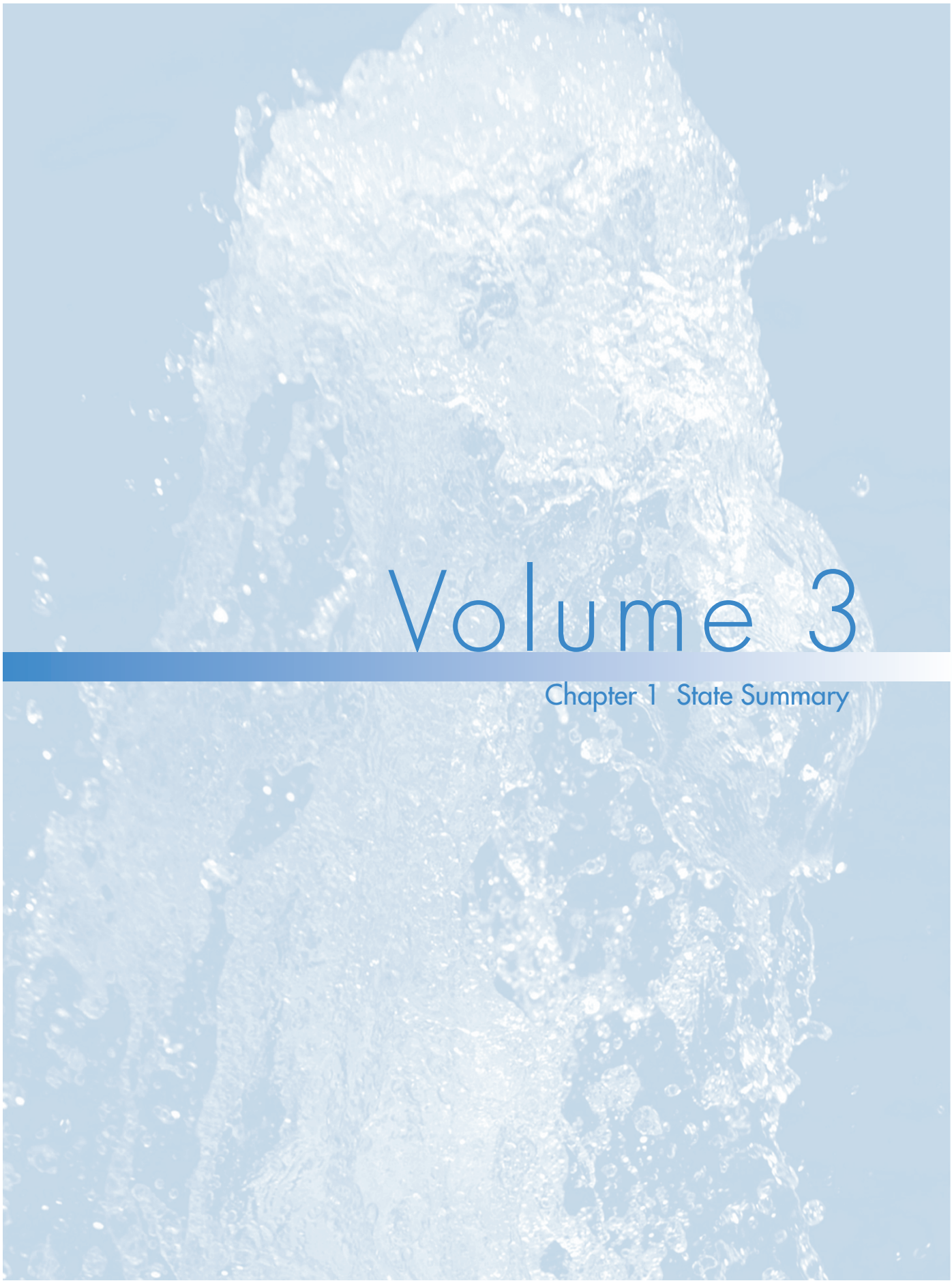

Volume 3

Chapter 1 State Summary

Chapter 1 State Summary

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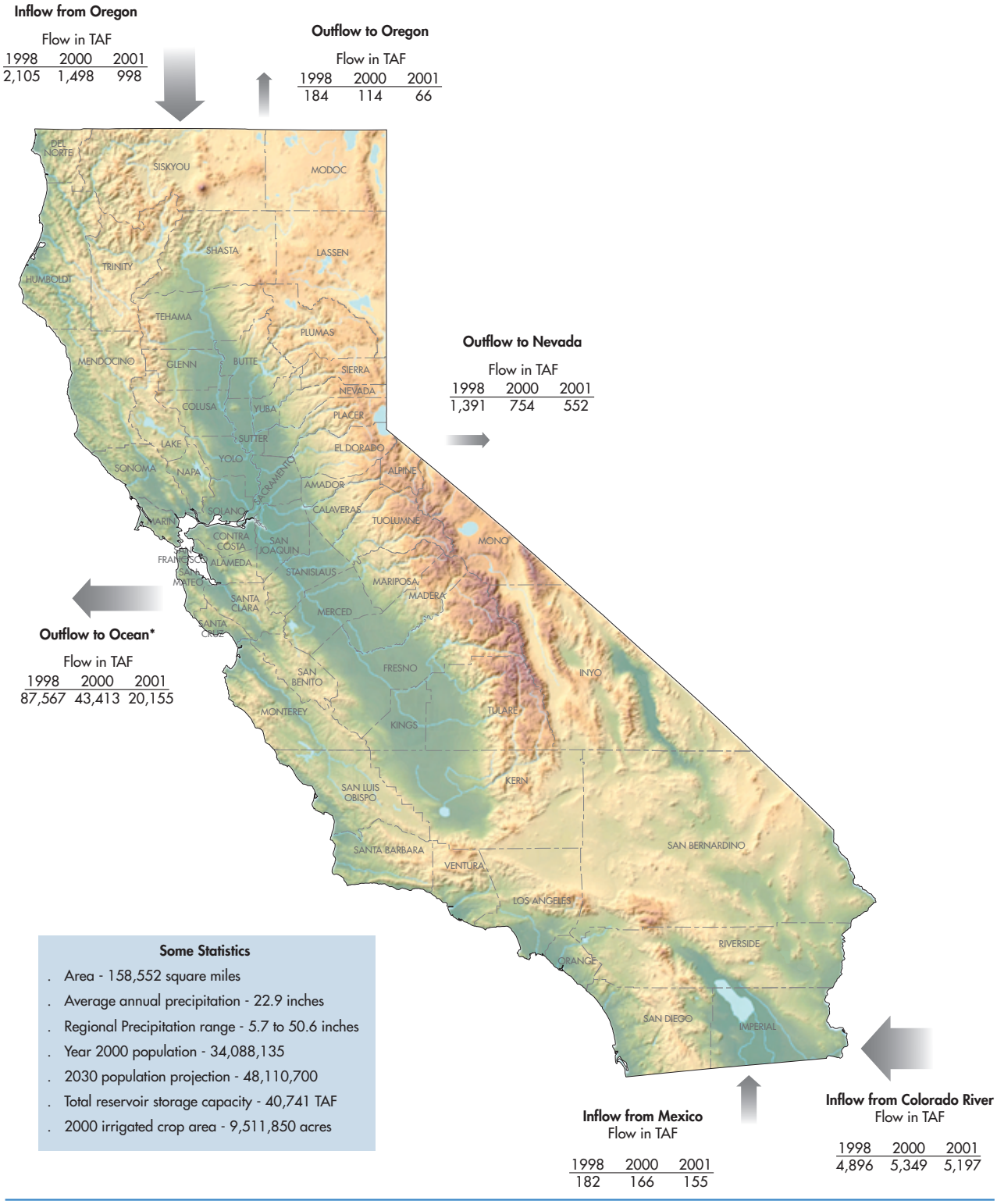
Figure 1-1 State of California



The third largest state, California has a variety of landforms and climates. Annual rainfall ranges from more than 140 inches in the north coast to less than 4 inches in the southeastern part. Arrows indicate annual flows entering and leaving the region for water years 1998, 2000, and 2001.

**Outflow to Ocean includes Wild and Scenic Rivers, regulated flows, and estimated wastewater outflows.*

Chapter 1 State Summary

This volume contains a statewide summary of water supply and water-use information for 1998, 2000 and 2001, followed by 12 individual regional reports. Ten reports summarize California's hydrologic regions. Two additional reports are included — one for the Mountain Counties region and another for the Sacramento-San Joaquin Delta region. These two reports describe areas with significant water issues that overlay parts of the other hydrologic regions. These 12 regional reports provide information on the current water supplies and uses in each area, as well as a discussion of the water issues, accomplishments, and challenges that are specific to each region of California. Figure 1-1 provides a geographic overview of California and summarizes surface water inflows and outflows with adjoining states.

Hydrologic Regions

California has a variety of climates and landforms. To better understand these diversities and plan for future needs, the Department of Water Resources (DWR) divides the state into 10 hydrologic regions, corresponding to the state's major water drainage basins. Using the drainage basins as planning boundaries allows logical tracking of natural water runoff and accounting of surface and groundwater supplies. See Figure 1-2 and Box 1-1 California's 10 Hydrologic Regions.

Box 1-1 California's 10 Hydrologic Regions

North Coast. Klamath River and Lost River Basins, and all basins draining into the Pacific Ocean from Oregon south through the Russian River Basin.

San Francisco Bay. Basins draining into San Francisco, San Pablo, and Suisun Bays, and into the Sacramento River downstream from Collinsville; western Contra Costa County; and basins directly tributary to the Pacific Ocean below the Russian River watershed to the southern boundary of the Pescadero Creek Basin.

Central Coast. Basins draining into the Pacific Ocean below the Pescadero Creek watershed to the southeastern boundary of Rincon Creek Basin in western Ventura County.

South Coast. Basins draining into the Pacific Ocean from the southeastern boundary of Rincon Creek Basin to the international border with Mexico.

Sacramento River. Basins draining into the Sacramento River system in the Central Valley (including the Pit River drainage), from the Oregon border south through the American River drainage basin.

San Joaquin River. Basins draining into the San Joaquin River system, from the Cosumnes River basin on the north through the southern boundary of the San Joaquin River watershed.

Tulare Lake. The closed drainage basin at the south end of the San Joaquin Valley, south of the San Joaquin River watershed, encompassing basins draining to Kern Lakebed, Tulare Lakebed, and Buena Vista Lakebed.

North Lahontan. Basins east of the Sierra Nevada crest and west of the Nevada state line, from the Oregon border south to the southern boundary of the Walker River watershed.

South Lahontan. The interior drainage basins east of the Sierra Nevada crest, south of the Walker River watershed, northeast of the Transverse Ranges, and north of the Colorado River Region. The main basins are the Owens and the Mojave River Basins.

Colorado River. Basins south and east of the South Coast and South Lahontan regions; areas that drain into the Colorado River, Salton Sea, and other closed basins north of the border with Mexico.

California is a state of contrasts and diversity as illustrated in this satellite image of Central California. Visible to the east are the forested slopes and snow-covered higher peaks of the Sierra Nevada and the light blue Lake Tahoe. The great Central Valley appears in center of the image. Farther west are the Coast Range, the San Francisco Bay and Delta, and the Pacific Ocean. (Photo courtesy of NASA)

For planning and data collection, DWR subdivides the 10 hydrologic regions into 56 planning areas (PAs) plus a more detailed breakdown into 278 detailed analysis units or DAUs (see Box 1-2 for more abbreviations used in this summary). Most of DWR data collection and analyses are started at the DAU level. This water plan update then gathers results into hydrologic regions for presentation.

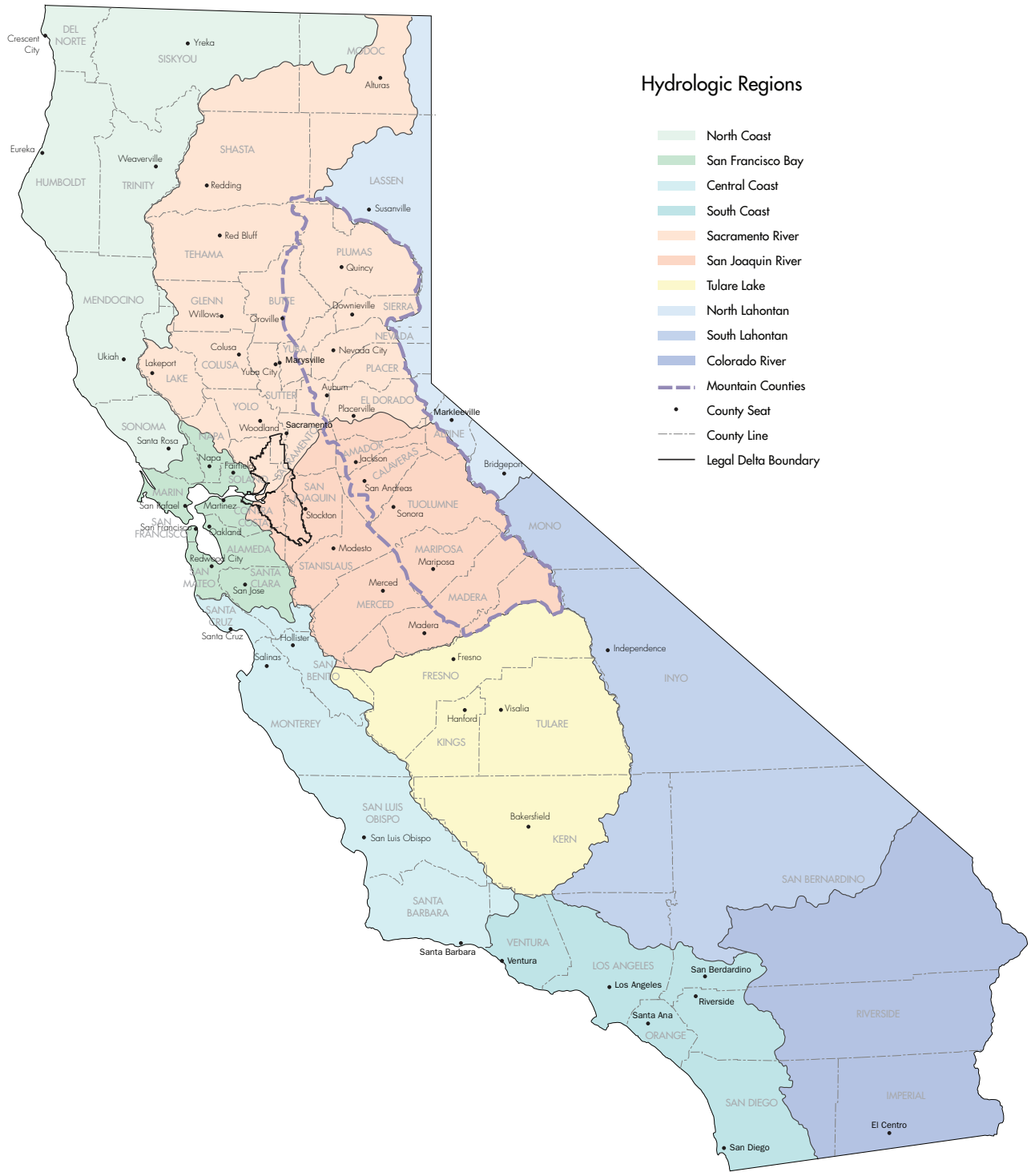
Overlay Areas

Some areas of the state with common water issues or interests often cross the boundaries from one hydrologic region to another. This is the first water plan update in the Bulletin 160 series to describe overlay areas. The two regional overlays in this report are the Mountain Counties region and the Sacra-

Box 1-2 Acronyms Used in State Summary

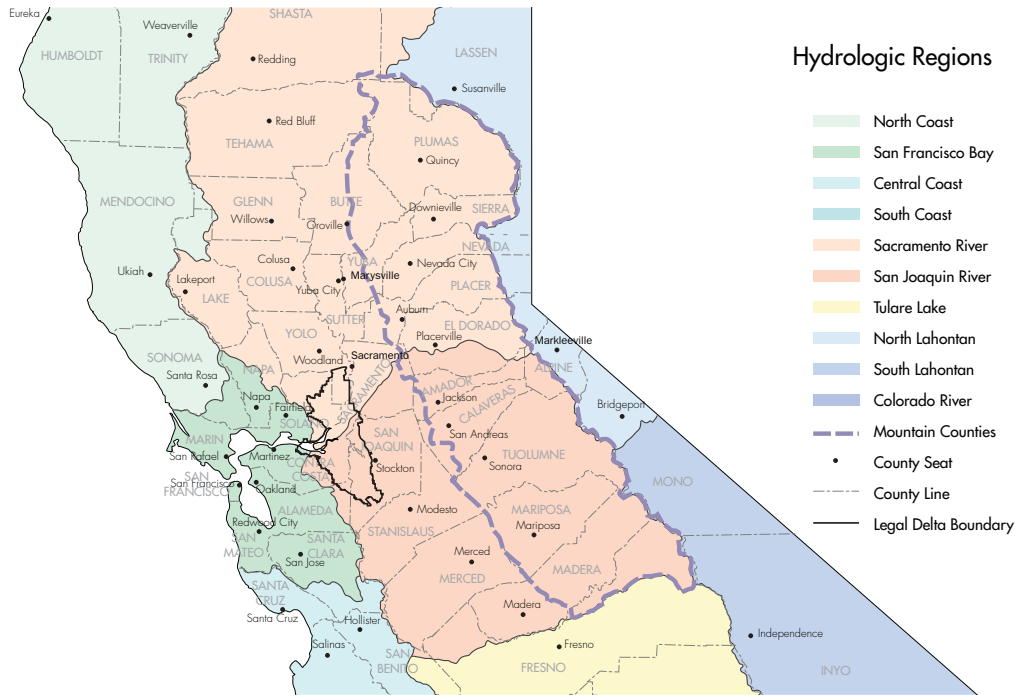
ABAG—Association of Bay Area Governments
CALFED—State and Federal Bay Delta Authority
CBDA—California Bay-Delta Authority
DAU—Detailed Analysis Unit
DWR—California Department of Water Resources
ET—Evapotranspiration
ETAW—Evapotranspiration of Applied Water
maf—million acre-feet
PA—Planning Area
SWP—State Water Project
SWRCB—State Water Resource Control Board
taf—thousand acre-feet

Figure 1-2 Hydrologic regions with Mountain Counties and Legal Delta



The California Department of Water Resources divides the state into 10 hydrologic regions that correspond to its major drainage basins. This water plan update also describes the Mountain Counties and Sacramento-San Joaquin Delta as two overlay areas of special interest.

Figure 1-3 Mountain Counties and Legal Delta overlays



Some areas of California with common water issues or interests span more than one hydrologic region and are called overlay areas. The Sacramento-San Joaquin Delta and the Mountain Counties are two overlay areas described in this water plan update.

mento – San Joaquin Delta region (see Figure 1-3 and Box 1-3 Two Overlay Areas). There are many other regional overlays that could be developed, based on boundaries such as county lines, regional water districts, or integrated regional planning areas. Two examples of other regional agencies that could be distinguished in this manner are the California Bay-Delta Authority's (CBDA) Southern California regional area of influence and the nine-county regional boundary for the Association of Bay Area Governments.

Coordination of Regional Reports

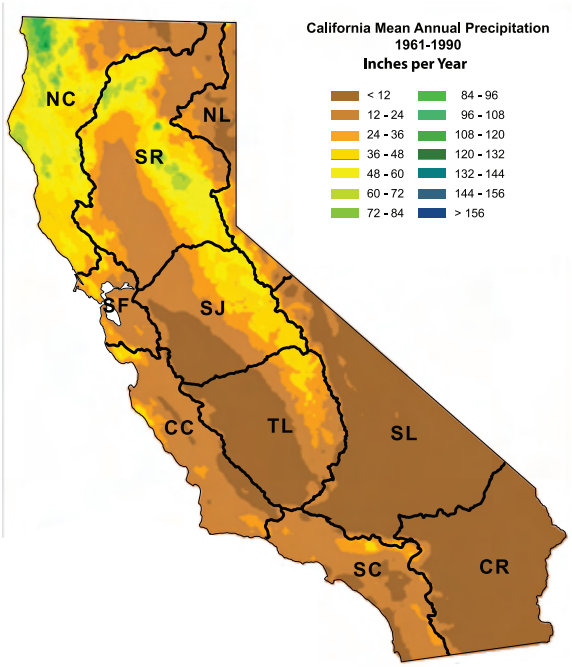
As this California Water Plan Update 2005 was being prepared, CBDA was also preparing multiyear plans for implementation of the CALFED Bay-Delta Plan. As part of that activity, CBDA was preparing a description of regional water management needs as well as regional and state plans to meet those needs for all regions within the CALFED solution area. CBDA is interested in providing the most up-to-date information on how CALFED implementation is being integrated with regional efforts to address both local and state needs.

Box 1-3 Two Overlay Areas

Mountain Counties. The Mountain Counties include the foothills and mountains of the western slope of the Sierra Nevada and a portion of the Cascade Range. The area includes the eastern portions of the Sacramento River and San Joaquin River hydrologic regions. This area shares common water and other resource issues and is the origin for much of the state's developed surface water supply.

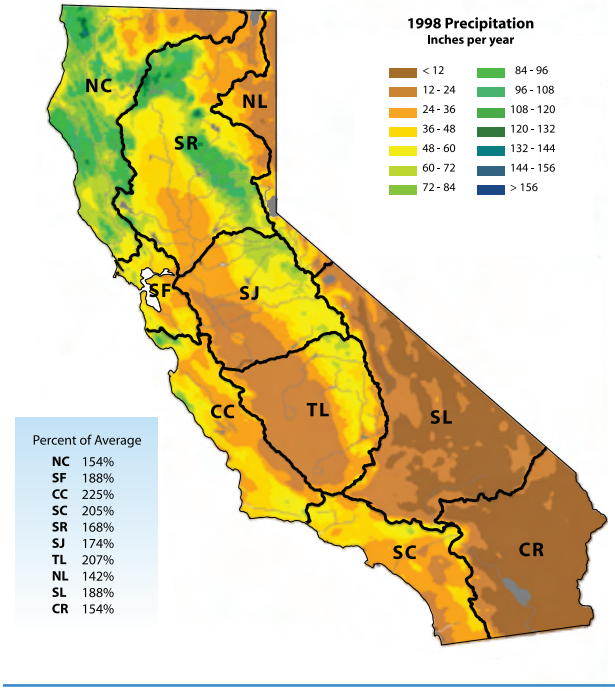
Sacramento-San Joaquin Delta. The Legal Delta includes about 740,000 acres of tidally influenced land near the confluence of the Sacramento and San Joaquin Rivers. While the Delta occupies portions of the Sacramento, San Joaquin and a small part of the San Francisco hydrologic regions, the Delta is described as an overlay area because of its common characteristics, environmental significance, and the important role it has in the State's water systems.

Figure 1-4 Range of average annual precipitation across regions, 1961 - 1990



Color contour map shows 30-year average annual precipitation throughout California. Fourteen colors indicate ranges of precipitation from a low range less than 12 inches per year to a high range greater than 156 inches per year. The 10 hydrologic regions are delineated on the map.

Figure 1-5 Range of actual precipitation across regions, 1998



Color contour map shows range of actual precipitation throughout California in water year 1998. Percentage of average precipitation for each hydrologic region is shown in box. In 1998, an El Nino year, all regions received from 1.5 to 2 times their average precipitation.

In October 2003, DWR and CBDA agreed that the regional reports that fall within the CALFED solution area should be jointly coordinated and prepared. This includes the Sacramento River, San Francisco Bay, San Joaquin River, Tulare Lake, and South Coast hydrologic regions as well as the Sacramento-San Joaquin Delta overlay. As part of this ongoing coordination, CBDA and DWR will work cooperatively to add additional information to these joint reports, regarding local or regional water management needs and plans to meet those needs as it becomes available.

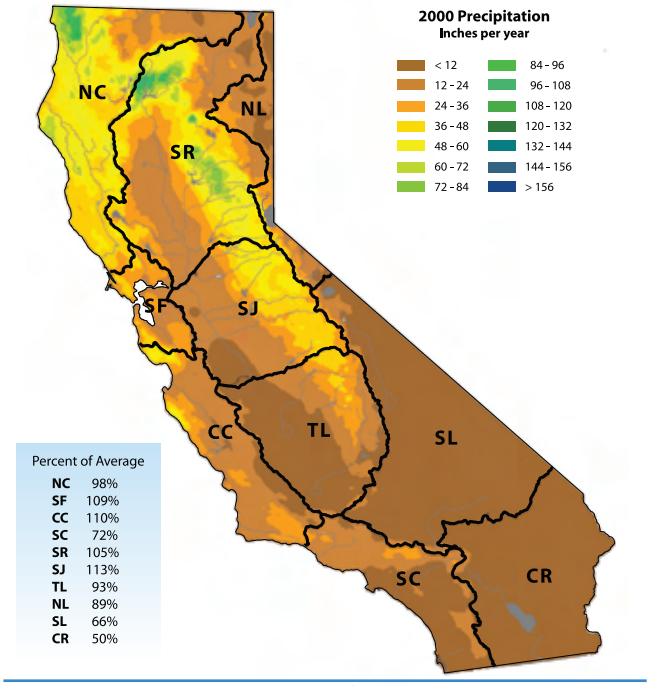
Hydrology for Current Conditions

Previous updates to the California water plan presented information about current water use and supplies by using a process that statistically "normalized" all water year data to represent average conditions. For Bulletin 160-98, year 1995 was chosen to represent current conditions and levels of water use. However, water year 1995 was actually classified as a wet year. Thus to develop information about average water year uses and supplies, the actual annual water supply and use data was statistically adjusted (also called normalized) based on historical trends, so that the 1995 level of all water uses represented what would be expected to occur in a statistically average water supply year. In the same way, a drought scenario was calculated to represent 1995 level water uses under drought water supply conditions.

As a result of significant public advisory committee input and recommendations for California Water Plan Update 2005, the previous process was changed. The advisory committee and the public requested that data for current levels of water use be prepared and presented from recent actual years, without any statistical adjustments. Three years were selected to show the range of actual water supplies and uses, based on a range of hydrologic conditions:

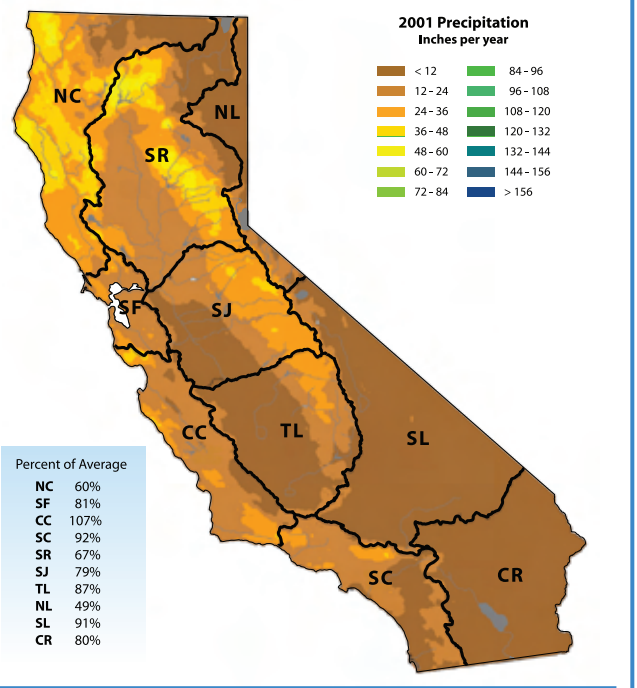
- 1998, which was a wet water-supply year statewide
- 2000, an overall average or normal water year
- 2001, a below average or dry year for most of the state

Figure 1-6 Range of actual precipitation across regions, 2000



Color contour map shows range of actual precipitation throughout California in water year 2000. Percentage of average precipitation for each hydrologic region is shown in box. In 2000, most regions received near average precipitation, while the South Coast, South Lahontan, and Colorado River regions received significantly less.

Figure 1-7 Range of actual precipitation across regions, 2001



Color contour map shows range of actual precipitation throughout California in water year 2001. Percentage of average precipitation for each hydrologic region is shown in box. In 2001, northern regions received significantly less than average precipitation, while more southern regions received just below average precipitation.

A consequence of this new method is that the actual data presented in this report is not directly comparable to the type of data presented in previous Bulletin 160 updates. The three recent years reflect the supplies and uses at a certain time and under specific conditions. Similarly, the data for 2001 do not constitute drought conditions, but only present actual conditions for a single dry water year.

In addition, these generally wet, average, and dry conditions for the entire state are not universally the same for all regions of the state. Figure 1-4 presents a map depicting long-term (based on years 1961 – 1990) average annual precipitation amounts throughout the state. For comparison, Figures 1-5, 1-6, and 1-7 show the range of actual precipitation across the different regions of the state for individual years 1998, 2000, and 2001 respectively. These maps were developed using data from National Weather Service's California Normal Stations. See Volume 5 Technical Guide for further information.

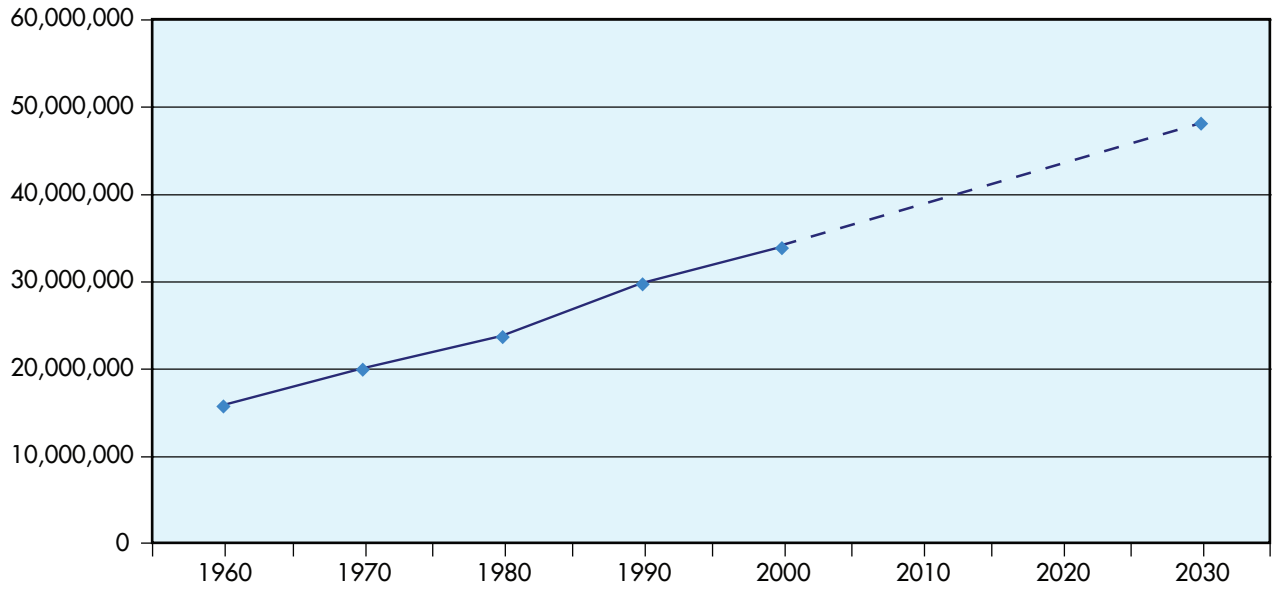
Population growth is a major factor that influences current and future water uses. California's population increased from about 30 million in 1990 to about 36.5 million in 2005. The California Department of Finance projects that the population could exceed 48 million by 2030 (Figure 1-8).

Water Portfolios

Previous updates to the California water plan have only provided regional and statewide water information for the developed water supplies and identified uses, but not for the entire water supply of the whole state. For California Water Plan Update 2005, a new concept was developed (nicknamed the water portfolio) to describe and evaluate the entire water resources of the state. The reasons for documenting this expanded water portfolio concept are to:

- identify and evaluate all of the statewide water supply sources whether or not they are currently developed and used,
- provide better information on the disposition of our source waters statewide by including additional categories of water supply and use,
- present water balances using accepted accounting principles,

Figure 1-8 State of California population



The nation's most populous state is now growing by about 600,000 people per year. The California Department of Finance projects that the state's population may exceed 48 million by 2030 and 55 million by 2050.

- provide insight where there may be underutilized "assets" (supply) and unmet "liabilities" (uses),
- provide insight about natural, physical (infrastructure) and institutional constraints, and water management decisions, by combining water balances with narrative discussions,
- identify 'data gaps' where additional information is needed to evaluate supplies and uses, and
- include key supplemental information such as water quality, water rights, and water contracts.

This new concept was derived from a comparison with the principles of a traditional financial accounting portfolio, and is intended to identify all of the state's water assets whether or not they are currently developed and used.

The water portfolios are based on the concept of the hydrologic cycle, and identify all possible categories of statewide water supplies and uses for each of the three specified years (1998, 2000, and 2001). On a statewide and regional basis, the portfolio diagrams also show the routing of water from initial source of supply to final disposition. The basic data and assumptions that are presented in these portfolio diagrams have been assembled for smaller local and regional areas (PAs and DAUs), and then accumulated to compile water portfolio totals for each hydrologic region and statewide. All of the information presented in the portfolio diagrams has also been cross-referenced by number codes to the tabular versions of the data. For consistency in each of the subsequent regional reports within Volume 3, the same portfolio format and data tables are used (see Box 1-4 Water Portfolio Components).

The primary reason for using these new water portfolio tables and flow diagrams is to provide an accounting of all water that enters and leaves the state and that is exchanged between the regions. This is important to all water planning activities. (See Figure 1-9 for regional inflows and outflows and further discussion under Statewide Water Portfolio Results later in this chapter). One shortcoming of this expanded process is that there are many regions of the state where some of the water portfolio data categories have never been measured. The resulting water portfolio tables show many categories where inadequate data are available. However, the ability to identify what data are needed is an important byproduct of this process. Another disadvantage resulting from the use of real data from three specific years is that those years provide no information about how supplies and demands would change during a drought sequence of several dry years. The collection of water supply and water use data for a series of 10 or more actual years would be very helpful toward the development of representative conditions for both average and extended droughts.

Applied Water Methodology

As previously developed in Bulletin 160-98, Bulletin 160-05 computes dedicated water supplies and uses on the basis of applied water data. Applied water refers to the total amount of water that is diverted from any source to meet the demands of water users, without adjusting for water that is used up, returned to the developed supply or irrecoverable. Within Volume 3, Tables 1-1 and 1-2 and Figure 1-10 present total statewide information on an applied water basis (see next section for discussion of Figure 1-10 and Tables 1-1 and 1-2). However, for the remaining statewide tables and each of the individual regional reports (Chapters 2 through 13), the information has been expanded to also present net water uses and water depletion. Net water supply and net water use data are smaller than applied water use. Net water use consists of water that is consumed in the system, irrecoverable water and outflow, while applied water also includes reuse of surface and groundwater supplies. Water depletion is net water use minus water that can be later recovered, such as deep percolation and return flow to developed supply (see Box 1-5 Key Water Supply and Use Definitions). Water supply information that is presented using applied water methodology is easier for local water agencies to evaluate because applied water use information is closer in concept to agency water system delivery data.

Box 1-4 Water Portfolio Components

The water portfolios for the California Water Plan Update consist of the following items

Flow Diagrams

The flow diagrams presented in Update 2005 are an expanded version of the diagram that originally appeared in Bulletin 160-83 on page 88. The flow diagram begins with the sources of water, such as precipitation and inflows into the state, and attempts to track all the water as it flows through many different uses until it reaches its ultimate destination in the ocean, an inland sea or as evaporation to the atmosphere. Diagrams have been prepared for each of the 10 hydrologic regions, Mountain Counties, and statewide totals by year.

Flow Diagram Table Format

The Flow Diagram Table provides additional detail for 1998, 2000 and 2001, by presenting each of the components of the flow diagram by number and category (inputs or withdrawals). In addition, the web portal for this Water Plan update includes the Flow Diagram Tables by Planning Area in each region.

Developed / Dedicated Water Balances

As previously in Bulletin 160-98, water balances are computed for applied water use, net water use and depletion for each region and planning area within a region, Mountain Counties, and for statewide totals. The balances include measured water supplies that are applied to the following dedicated or developed uses within a region:

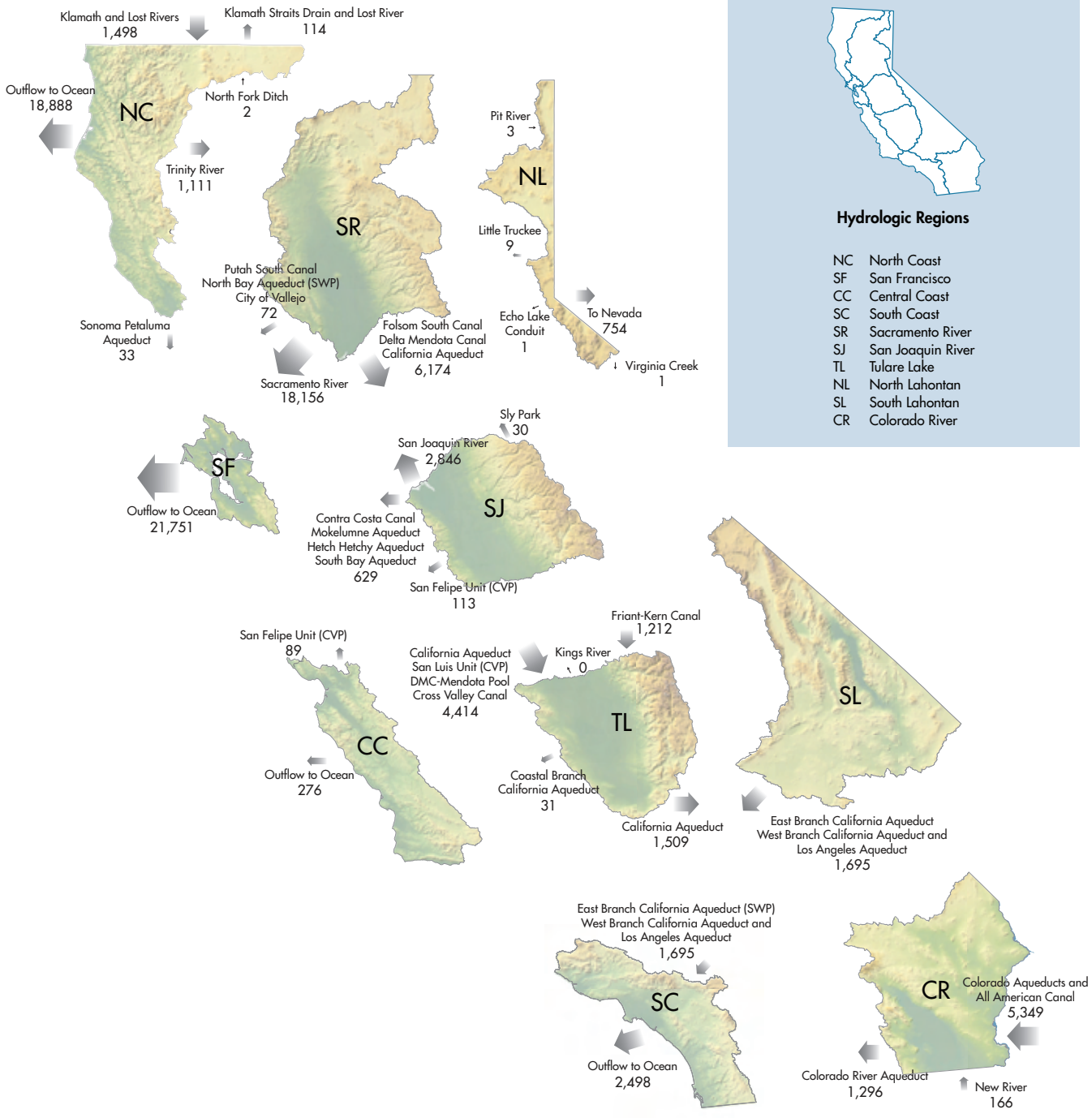
- Agricultural
- Urban (including commercial and industrial)
- Wildlife refuges (managed wetlands)
- Instream flow requirements
- Wild and scenic river requirements
- Required Delta outflow

These tables include reuse of water within a region, but not show water exported from a region.

Water Quality

Existing water quality basin plans prepared by the SWRCB and RWQCB will eventually become part of the California Water Plan. In the future, those basin plans along with other water quality reports will be integrated regionally into the water portfolios.

Figure 1-9 Regional inflows and outflows, year 2000 (an average water year)



Water moves great distances within and between California's 10 hydrologic regions, some through natural waterways and some through constructed water systems. Shown are the volumes of water in million acre-feet that flowed from one region to another in 2000, an average water year.

**Outflow to Ocean includes Wild and Scenic Rivers, regulated flows, and estimated wastewater outflows.*

Statewide Water Balance Summary

In average water years like 2000, California receives close to 200 million acre-feet of water from precipitation and imports from Colorado, Oregon and Mexico. Of this total supply, about 50 to 60 percent is either used by native vegetation; evaporates to the atmosphere; provides some of the water for agricultural crops and managed wetlands (effective precipitation); or flows to Oregon, Nevada, the Pacific Ocean, and salt sinks like saline groundwater aquifers and Salton Sea. The remaining 40 to 50 percent, called the dedicated or developed supply, is distributed among urban and agricultural uses, water for protecting and restoring the environment, or storage in surface water and groundwater reservoirs for later use. In any year, some of the dedicated supply includes water that is used multiple times (reuse) and water held in storage from previous years. Ultimately, about a third of the dedicated supply flows out to the Pacific Ocean or to other salt sinks, in part to meet environmental water requirements for designated Wild and Scenic rivers.

Table 1-1 summarizes the total supply and distribution of the dedicated supply to various uses within California for the three years evaluated. As indicated for wet (1998) and dry (2001) years, the total supply and the distribution of the dedicated supply to various uses do change significantly, compared to the average year 2000 values.

Box 1-5 Key Water Supply and Use Definitions

The water portfolio tables presented throughout Volume 3 summarize California's water supplies and urban, agricultural and environmental water uses for 1998, 2000 and 2001. Certain key concepts, defined below, provide an essential foundation for understanding and evaluating the water supplies and water uses presented in these tables.

Applied Water. The amount of water from any source needed to meet the demand of the user. Examples would include the quantity of water that is delivered at any of the following locations:

- The intake to a city water system or a factory.
- The farm headgate or other point of measurement for agricultural use.
- The diversion point to a managed wetland, either directly or from other drainage flows.

For instream use, applied water is quantified as the amount of stream flow dedicated to instream purposes (or reserved under federal or State wild and scenic rivers legislation). It is also identified as the amount of stream flow required for maintaining flow and water quality in the Sacramento - San Joaquin Delta per the SWRCB's Decision 1630 or previous standards.

Net Water. The amount of water needed in a water service area to meet all demands. It is the sum of several components including (1) evapotranspiration of applied water within an area, (2) the irrecoverable water from the distribution system, and (3) the agricultural return flow or treated urban wastewater leaving the area.

Irrecoverable Water. The amount of water that flows to a salt sink, is used by the growth process of plants (evapo transpiration), or evaporates from a conveyance facility or drainage canal.

Evapotranspiration. ET is the amount of water transpired (given off), retained in plant tissues, and evaporated into the atmosphere from plant tissues and the surrounding soil surfaces.

Evapotranspiration of Applied Water. ETAW is the portion of total ET which was provided from the applied irrigation water.

Depletion. The amount of water consumed within a service area that is no longer available as a source of supply. For agricultural and environmental wetlands water use, depletion is the sum of irrecoverable water and the ETAW due to crops, wetlands vegetation, and flooded water surfaces. For urban water use, depletion is the ETAW due to landscaping, wastewater outflow to a salt sink, and incidental ET. For environmental instream use, depletion is the amount of dedicated flow that proceeds to a salt sink.

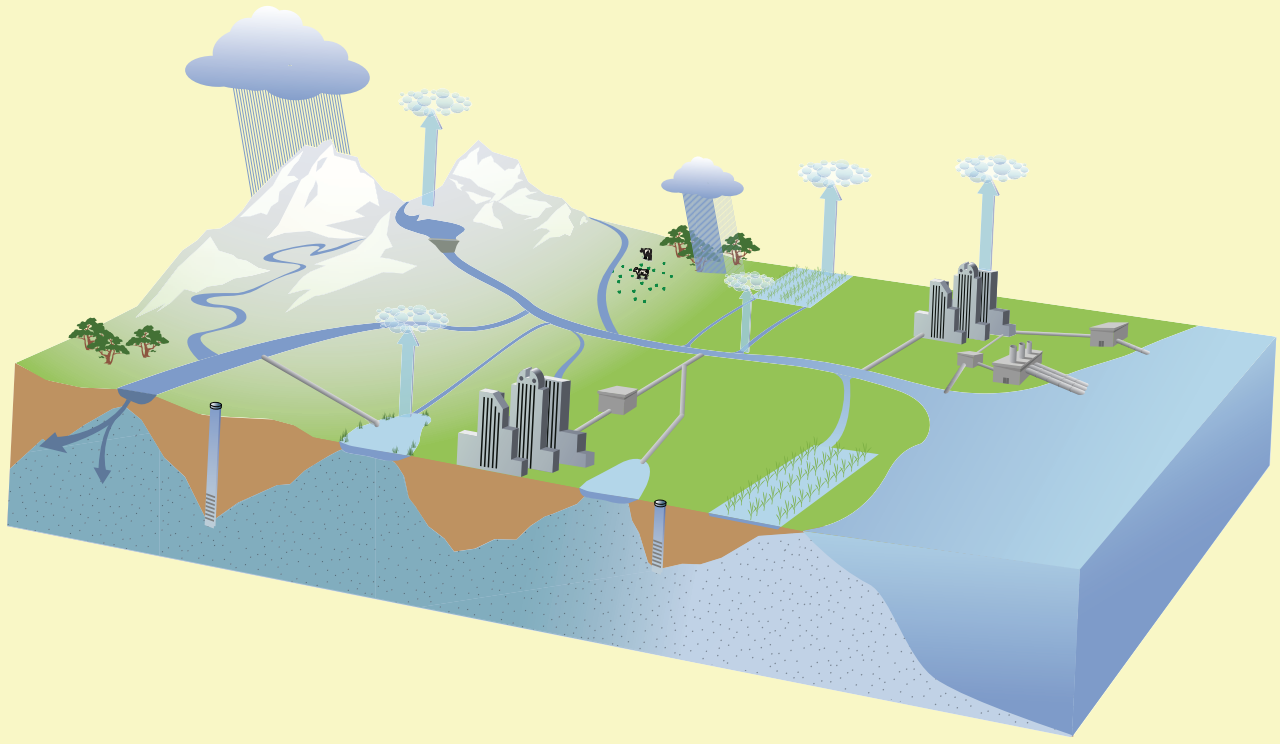
Table 1-1 California water summary - MAF

	1998 (171% of normal)[a]		2000 (97% of normal)[a]		2001 (72% of normal)[a]	
Total supply (precipitation & imports)	336.9		194.7		145.5	
Total uses, outflows, & evaporation	331.5		200.4		159.9	
Net storage changes in state	5.5		-5.7		-14.3	
Distribution of dedicated supply (includes reuse) to various applied water uses						
Urban uses	7.8	(8%)	8.9	(11%)	8.6	(13%)
Agricultural uses	27.3	(29%)	34.2	(41%)	33.7	(52%)
Environmental water[b]	59.4	(63%)	39.4	(48%)	22.5	(35%)
Total dedicated supply	**94.5**		**82.5**		**64.8**	

maf = million acre-feet

a. Percent of normal precipitation. Water year 1998 represents a wet year; 2000, average water year; 2001, drier water year.

b. Environmental water includes instream flows, wild and scenic flows, required Delta outflow, and managed wetlands water use. Some environmental water is reused by agricultural and urban water users.



Key components of the illustrated flow diagram are shown as characteristic elements of the hydrologic cycle. This volume has flow diagrams for statewide water summary in this chapter and for regional water summaries in their respective chapters.

Table 1-2 State of California water balance summary - MAF

Water Entering the Region – Water Leaving the Region = Storage Changes in Region

	Water Year (Percent of Normal Precipitation)		
	1998 (171%)	2000 (97%)	2001 (72%)
Water Entering the State			
Precipitation	329.6	187.7	139.2
Inflow from Oregon/Mexico	2.3	1.7	1.1
Inflow from Colorado River	5.0	5.3	5.2
Imports from Other Regions	N/A	N/A	N/A
Total	**336.9**	**194.7**	**145.5**
Water Leaving the State			
Consumptive Use of Applied Water * (Ag, M&I, Wetlands)	22.5	27.9	27.8
Outflow to Oregon/Nevada/Mexico	1.6	0.9	0.7
Exports to Other Regions	N/A	N/A	N/A
Statutory Required Outflow to Salt Sink	43.8	28.0	13.9
Additional Outflow to Salt Sink	73.0	37.1	17.7
Evaporation, Evapotranspiration of Native Vegetation, Groundwater Subsurface Outflows, Natural and Incidental Runoff, Ag Effective Precipitation & Other Outflows	190.5	106.5	99.7
Total	**331.4**	**200.4**	**159.8**
Storage Changes in State [+] Water added to storage [–] Water removed from storage			
Change in Surface Reservoir Storage	7.2	-1.3	-4.6
Change in Groundwater Storage **	-1.7	-4.4	-9.7
Total	**5.5**	**-5.7**	**-14.3**
Applied Water * (compare with Consumptive Use)	33.9	41.8	41.2

***Footnote for applied water**

Consumptive use is the amount of applied water used and no longer available as a source of supply. Applied water is greater than consumptive use because it includes consumptive use, reuse, and outflows.

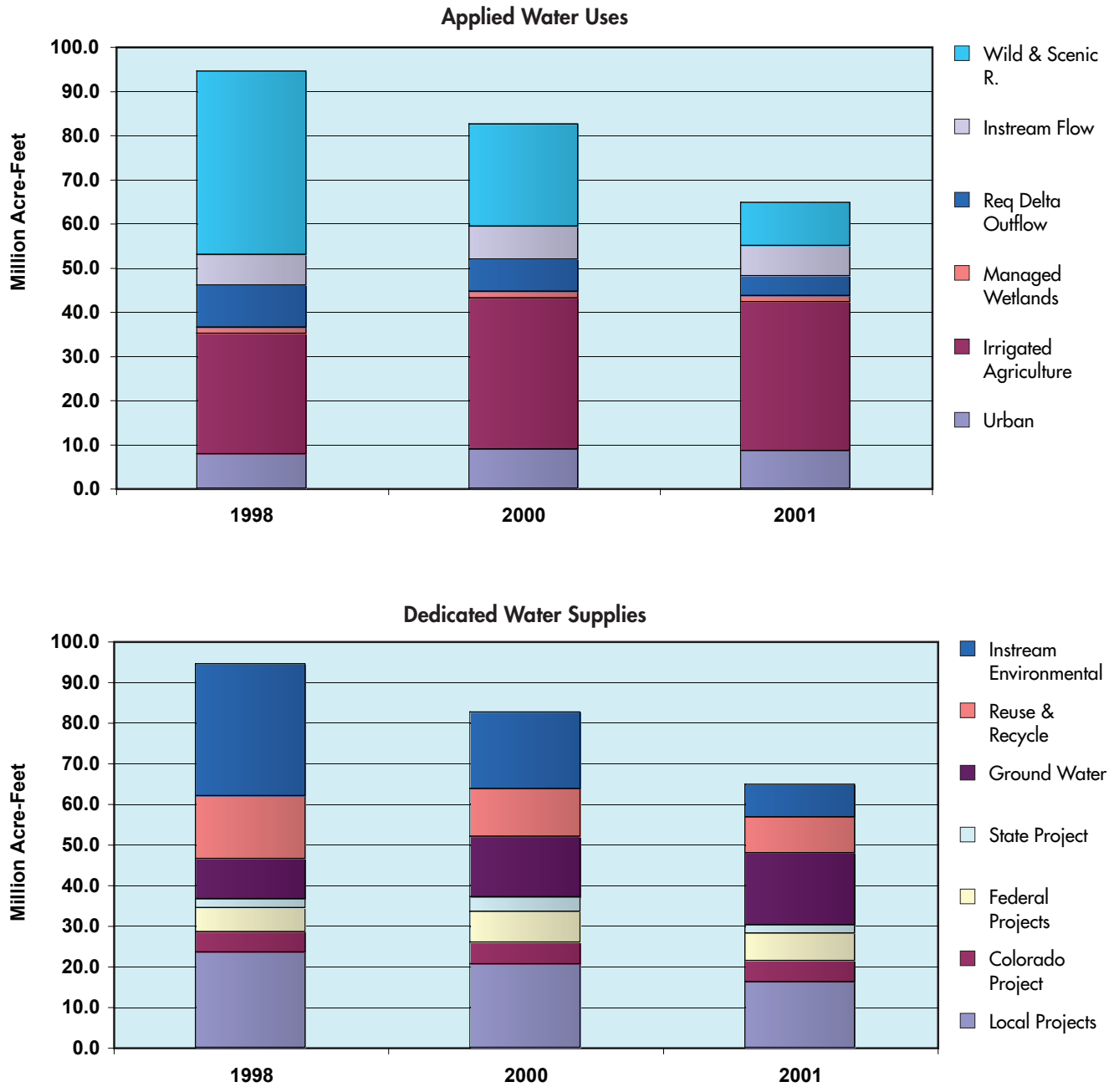
****Footnote for change in Groundwater Storage**

Change in Groundwater Storage is based upon best available information. Basins in the north part of the state (North Coast, San Francisco, Sacramento River and North Lahontan regions and parts of Central Coast and San Joaquin River regions) have been modeled – spring 1997 to spring 1998 for the 1998 water year and spring 1999 to spring 2000 for the 2000 water year. All other regions and year 2001 were calculated using the following equation:

GW change in storage =
intentional recharge + deep percolation of applied water + conveyance deep percolation - withdrawals

This equation does not include the unknown factors such as natural recharge and subsurface inflow and outflow.

Figure 1-10 California water balance for water years 1998, 2000, 2001



Three years show a marked change in amount and relative proportions of water delivered to urban and agricultural sectors and water dedicated to the environment (applied water, top chart), where the water came from, and how much was reused among sectors (dedicated water supplies, bottom chart).

Table 1-3 California water use and distribution of dedicated supplies - MAF

	1998			2000			2001		
	Applied Water Use	Net Water Use	Depletion	Applied Water Use	Net Water Use	Depletion	Applied Water Use	Net Water Use	Depletion
WATER USE									
Urban									
Large Landscape	0.6			0.7			0.6		
Commercial	1.3			1.6			1.6		
Industrial	0.5			0.6			0.6		
Energy Production	0.1			0.1			0.1		
Residential - Interior	2.9			3.3			3.1		
Residential - Exterior	2.0			2.3			2.3		
Evapotranspiration of Applied Water		2.3	2.3		2.7	2.7		2.6	2.6
E&ET and Deep Perc to Salt Sink		0.6	0.6		0.7	0.7		0.7	0.7
Outflow		3.1	3.1		3.6	3.6		3.5	3.5
Conveyance Applied Water	0.2			0.2			0.2		
Conveyance Evaporation & ETAW		0.2	0.2		0.2	0.2		0.2	0.2
Conveyance Deep Perc to Salt Sink		0.0	0.0		0.0	0.0		0.0	0.0
Conveyance Outflow		0.0	0.0		0.0	0.0		0.0	0.0
GW Recharge Applied Water	0.2			0.1			0.0		
GW Recharge Evap + Evapotranspiration		0.0	0.0		0.0	0.0		0.0	0.0
Total Urban Use	**7.8**	**6.3**	**6.3**	**8.9**	**7.2**	**7.2**	**8.6**	**7.0**	**7.0**
Agriculture									
On-Farm Applied Water	24.1			31.1			31.2		
Evapotranspiration of Applied Water		16.8	16.8		21.6	21.6		21.8	21.8
E&ET and Deep Perc to Salt Sink		0.8	0.8		0.8	0.8		0.8	0.8
Outflow		3.7	1.5		4.0	1.8		4.0	2.1
Conveyance Applied Water	2.1			2.4			2.2		
Conveyance Evaporation & ETAW		0.7	0.7		0.9	0.9		0.8	0.8
Conveyance Deep Perc to Salt Sink		0.2	0.2		0.2	0.2		0.2	0.2
Conveyance Outflow		0.3	0.3		0.4	0.3		0.4	0.3
GW Recharge Applied Water	1.1			0.7			0.3		
GW Recharge Evap + Evapotranspiration		0.0	0.0		0.0	0.0		0.0	0.0
Total Agricultural Use	**27.3**	**22.6**	**20.4**	**34.2**	**27.8**	**25.6**	**33.7**	**27.9**	**26.0**
Environmental									
Instream									
Applied Water	6.9			7.5			6.8		
Outflow		2.2	2.2		2.1	2.1		2.2	2.2
Wild & Scenic									
Applied Water	41.6			23.1			9.8		
Outflow		32.1	32.1		18.2	18.2		6.9	6.9
Required Delta Outflow									
Applied Water	9.5			7.2			4.5		
Outflow		9.5	9.5		7.2	7.2		4.5	4.5
Managed Wetlands									
Habitat Applied Water	1.4			1.5			1.3		
Evapotranspiration of Applied Water		0.5	0.5		0.6	0.6		0.6	0.6
E&ET and Deep Perc to Salt Sink		0.0	0.0		0.0	0.0		0.0	0.0
Outflow		0.5	0.3		0.4	0.3		0.4	0.3
Conveyance Applied Water	0.0			0.0			0.0		
Conveyance Evaporation & ETAW		0.0	0.0		0.0	0.0		0.0	0.0
Conveyance Deep Perc to Salt Sink		0.0	0.0		0.0	0.0		0.0	0.0
Conveyance Outflow		0.0	0.0		0.0	0.0		0.0	0.0
Total Managed Wetlands Use	1.4	1.0	0.8	1.5	1.1	1.0	1.3	1.0	0.9
Total Environmental Use	**59.4**	**44.8**	**44.7**	**39.4**	**28.7**	**28.5**	**22.5**	**14.7**	**14.5**
TOTAL USE AND OUTFLOW	**94.5**	**73.8**	**71.4**	**82.5**	**63.6**	**61.3**	**64.8**	**49.7**	**47.5**
DEDICATED WATER SUPPLIES									
Surface Water									
Local Deliveries	22.5	22.5	21.1	19.8	19.5	18.2	15.3	15.3	14.3
Local Imported Deliveries	1.0	1.0	0.9	0.8	0.8	0.8	0.8	0.8	0.8
Colorado River Deliveries	5.0	5.0	4.7	5.3	5.3	5.0	5.2	5.2	4.8
CVP Base and Project Deliveries	5.3	5.3	4.9	6.7	6.7	6.3	6.1	6.1	5.7
Other Federal Deliveries	0.7	0.7	0.6	0.8	0.8	0.7	0.7	0.7	0.6
SWP Deliveries	2.1	2.1	2.0	3.6	3.6	3.4	2.1	2.1	1.9
Required Environmental Instream Flow	32.4	32.4	32.4	18.7	18.7	18.7	8.0	8.0	8.0
Groundwater									
Net Withdrawal	4.4	4.4	4.4	7.8	7.8	7.8	11.0	11.0	11.0
Deep Percolation of Surface and GW	5.6			7.0			6.7		
Reuse/Recycle									
Reuse Surface Water	15.1			11.5			8.5		
Recycled Water	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
TOTAL SUPPLIES	**94.5**	**73.8**	**71.4**	**82.5**	**63.6**	**61.3**	**64.8**	**49.7**	**47.5**
Balance = Use - Supplies	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***

Table 1-2 provides more detailed information about total statewide water supply sources and provides estimates for the primary uses of the state's supplies for these three years. As indicated, a large component of the statewide water supply is used by natural processes, such as evaporation, evapotranspiration from native vegetation and forests, and percolation to groundwater. This water is generally not counted as part of the dedicated water supplies. Each of the regional reports within Volume 3 presents the same tabular information at the regional level. For some of the items presented in Table 1-2, the numerical values were developed by estimation techniques, because measured data are not available on a statewide basis.

A statewide summary of dedicated water supplies and uses is presented in Table 1-3, which provides a more detailed breakdown of the components of developed supplies used for agricultural, urban, and environmental purposes. For each of the three water years, information is presented as both applied water and net water usage, as well as the calculated total water depletion. As previously mentioned, much of the environmental water usage in this table is actually dedicated to instream flow requirements and Wild and Scenic rivers, which in some cases can later be reused for other downstream purposes. Figure 1-10 identifies all of the water supply sources used to meet the developed and dedicated water uses statewide for years 1998, 2000 and 2001 and also summarizes all of the corresponding urban, agricultural and environmental water uses for the three years. In each of the following regional report chapters, similar regional bar charts are provided, which can be compared to Figure 1-10 to understand how each individual region compares to the statewide distribution.

Statewide Water Portfolio Results for Years 1998 (Wet), 2000 (Average), and 2001 (Dry)

Statewide summaries of water supplies and applied water uses are presented graphically in the portfolio flow diagram (Figures 1-11 and 1-12), and numerically for years 1998, 2000 and 2001 in the accompanying water portfolio data Table 1-4. These figures and tables are large-format and placed in the back of this chapter; similar regional graphics are placed in the back of the regional chapters. The primary purpose of these diagrams and tables is to present information for comparison about how water supplies and uses can vary between the wet, average, and dry hydrologic conditions that are represented by these three specific years. It is important to remember that actual water supply and water use information from these three years is only a snapshot of a single year's hydrology and water uses. It would not be appropriate to assume that other past or future years with similar hydrology (wet, average, or dry) would produce the same levels of water use as summarized in Table 1-4.

The statewide information has been assembled from the 10 individual hydrologic regions. The organization of the portfolio diagrams and the numerical identification for the data categories are consistent between the 10 regional reports and these statewide summaries. However, note that when water supply and water-use information from the regional reports is accumulated for the statewide totals, some categories, such as interregional water transfers between one hydrologic region and an adjoining region, are not applicable, so they are not shown in the statewide tables. Figure 1-9 presents a map of California's hydrologic regions with all interregional transfers shown, using data from average water year 2000. In the statewide diagrams and tables presented in this chapter, several categories indicate "incomplete" or "unknown" data for components of water supply and water use where information is either not available, or only partially available from some regions of the state. Within the data tables, the code "N/A" is used to identify categories where data are not available, and the symbol "-" is used to identify water data categories that are not applicable on a statewide basis.

On a statewide basis, Figure 1-12 shows a detailed flow diagram for water supplies and uses, with numerical references to data in Table 1-4 for 1998, 2000, and 2001. Companion Figure 1-11 presents the same information in an illustrated picture to graphically show the identified components of water supply, movement, and use. In the statewide and all of the regional portfolio flow diagrams throughout Volume 3, the information is consistently organized to show sources of water supply on the left side, water uses in the middle, and the ways that water leaves the state on the right side. To assist the reader in following the movement of water from initial sources to final disposition in these diagrams, water supplies, called deposits, are consistently shown in blue boxes, water uses are summarized in green boxes, and water withdrawals (how water leaves the state) are shown in yellow boxes. The numerical identification numbers in the small circles on the diagram correspond to the tabular presentation of the data in Table 1-4.

The flow diagram data (Table 1-4) presents the statewide water portfolio information from the flow diagram, with 61 major categories of water supply and water use identified. This statewide table is different from the regional data tables in the following chapters, in that there is only one column shown for each year with the water supply and applied water use values aggregated together. The regional tables in the following chapters are more detailed, because they

also present water-use information on a net-water basis and tabulate water depletions where appropriate. In addition, there are several water data categories that are accounted for at the regional level, but which lose their relevance at the statewide level, such as interregional water transfers.

Statewide Water Data Needs

When the concept of developing water portfolios with information about all of California's supplies and uses was first discussed, it was noted that there would be insufficient information available for many of the data categories and several of the less developed regions of the state. However, identifying the categories where inadequate information is available is a necessary first step toward making improvements in the types and amount of water data that needs to be collected.

The types of necessary technical information can be grouped into three categories:

- Data – factual or observed information, such as measurements or statistics including gauged flows in a river, population as measured by census, and salinity of a water sample. Sets of data can be raw as taken from a measurement device, elaborated by modifying it slightly as part of quality assessment and quality control measures, or supplemented to address missing measurements.
- Relationships or system interactions – descriptions of how the social, physical, and environmental systems affect or are affected by the status of water supply and water use in California. Examples include (1) how releases from a reservoir affect water temperature at a point in a river downstream, (2) the crop mix in a region and the expected market conditions for each crop, and (3) mountain snowpack conditions in February as used to forecast the delivery of State Water Project water.
- Estimates – inferred, derived or forecasted quantities based on available data, defined relationships, and other assumptions. Examples include population forecasts for the Los Angeles area in 2030, groundwater flows between adjacent regions, future available water deliveries, and the projected cost to implement water conservation best management practices.

There are a number of categories where data are simply not available or else it is very expensive to compile. The Data and Analytical Tools section of the Volume 4 Reference Guide contains additional information about these types of data needs in the article titled "Future Quantitative Analysis for California Water Planning." In addition, many types of data are available for the developed regions of the state, but significant gaps exist in the undeveloped parts of California, so that statewide summaries cannot be generated. Significant categories with insufficient data include:

- Statewide land use data, for example, delineation and acreage for native vegetation, urbanized regions and boundaries, areas with nonirrigated agriculture, and irrigated agriculture acreage and crop-type delineation
- Groundwater, including total natural recharge, subsurface inflow and outflow, recharge and extractions, water levels, and water quality
- Surface water, including natural and incidental runoff, local diversions, return flows, total stream flows, conveyance recoverable and irrecoverable water, and runoff to salt sinks
- Amounts of water consumed by evaporation from water surfaces, evapotranspiration from native vegetation, wetlands, urban runoff and nonirrigated agricultural production

A number of data items are necessary to calculate or estimate these categories. Some of the major data items needed to complete the water portfolio flow diagram and the water balances are listed below. These include the measurement and calculation of information needed to identify the differences between applied water use and consumptive water use. The major data items are:

- Information on the source of water supply - surface, groundwater, or amounts from both
- Data for the amounts of surface outflow leaving any identified region
- Water level data for depth to groundwater
- Groundwater recharge rates
- Water needed to maintain designated natural riparian habitats
- Evapotranspiration rates for all types of vegetation, which vary by the geographic region of the state
- Detailed surface water return flow information
- More detailed physical information about the water infrastructure for all watersheds, water systems and groundwater basins in the state

A significant increase in the amount of data collected and evaluated will be needed, before California can fully quantify and understand the state's water supplies and plan for future water needs.